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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,647	01/26/2004	Laura Wills Mirkarimi	10030753-1	1183
7590		12/13/2007	EXAMINER	
AGILENT TECHNOLOGIES, INC.			DEO, DUY VU NGUYEN	
Legal Department, DL429			ART UNIT	PAPER NUMBER
Intellectual Property Administration			1792	
P.O. Box 7599				
Loveland, CO 80537-0599				
			MAIL DATE	DELIVERY MODE
			12/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/765,647	MIRKARIMI, LAURA WILLS
	<b>Examiner</b>	<b>Art Unit</b>
	Duy-Vu N. Deo	1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 10/31/07.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                        | Paper No(s)/Mail Date. _____.                                     |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|   | 6) <input type="checkbox"/> Other: _____.                         |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fathimulla et al. (US 5,338,394) and further in view of Pearton et al. (Appl. Phys. Lett. 60 (7)).

Referring to claims 1, 2, 12, 13, Fathimulla describes a method for etching an III-V material comprising: placing the III-V substrate into a RIE chamber and etching the substrate with a gas mixture of HBr and CH<sub>4</sub> (claims 1-4). Unlike claimed invention, Fathimulla doesn't describe the gas mixture having H<sub>2</sub>. Pearton teaches a method for etching III-V material wherein the gas mixture includes H<sub>2</sub> (pages 839; left column). It would have been obvious for one skilled in the art at the time of the invention to modify Fathimulla in light of Pearton by including H<sub>2</sub> in the gas mixture because Pearton teaches addition of the H<sub>2</sub> to the gas mixture provide a much smoother surfaces and Fathimulla teaches that other combinations of gas composition can be used to give a smooth vertical feature (col. 3, line 65-68).

Referring to claims 6, 17, Fathimulla describes the P is about 1-5 mtorr (claim 9).

Referring to claims 7, 18, Pearton further describes the dc bias is 100 V (fig. 2).

Referring to claims 8, 19, with the via hole depth of 100 urn, as taught by Fathimulla,

this would create a vertical feature having an aspect ratio of greater than ten (col. 2, line 36-37). Referring to claims 9-11, 20 Fathimulla describes a SiN mask (col. 2, line 30-33).

Referring to claims 3-5, 14-16, applied prior art doesn't describe the percentages of the first, second, and third gas. However, the gas percentage is a result-effective variable as discussed by Pearton, where flow rates (gas percentage) of gases are experimented to achieve different etch rates (page 839; left column). Therefore, one skilled in the art would find it obvious to determine each gas percentage through routine experimentation in order to provide optimum gas flow rates or percentages to etch the substrate with a reasonable expectation of success.

### ***Response to Arguments***

3. Applicant's argument that Fathimulla doesn't teach using gas comprising CH<sub>2</sub> and H<sub>2</sub> is acknowledged. Appellant's argument that Fathimulla teaches away of using CH<sub>4</sub> and H<sub>2</sub> because they are recited by Fathimulla in the alternative is found unpersuasive because this is not teaching away but it just teaches a way of etching. There is no specific teaching from Fathimulla that CH<sub>4</sub> and H<sub>2</sub> can't be used together. Furthermore, teaching of replacing a mixture of CH<sub>4</sub>/H<sub>2</sub>/Ar with another gas mixture at certain processing parameters doesn't necessarily mean that the components of CH<sub>4</sub>/H<sub>2</sub>/Ar can't be used together. In fact, Pearton shows that at the time of the invention was made, H<sub>2</sub> is compatible with CH<sub>4</sub> for etching III-V materials and adding H<sub>2</sub> would provide a smooth etching or surface (page 838, col. 1, 1<sup>st</sup> and 2<sup>nd</sup>

paragraphs). As suggested by Pearton, the smooth surface is achieved by the addition of the H<sub>2</sub> (page 839, 1<sup>st</sup> column, 2<sup>nd</sup> paragraph) and Fathimulla teaches that other combinations of gas composition can be used to give a smooth vertical feature (col. 3, line 65-68). Fathimulla also shows that H<sub>2</sub> is compatible with HBr (col. 2, line 10-18). Therefore, using H<sub>2</sub> with HBr/CH<sub>4</sub> would be obvious to one skilled in the art at the time of the invention was made because it would provide a smooth etching or surface.

Applicant's argument that one skilled in the art would be discouraged from using CH<sub>4</sub> and H<sub>2</sub> because Pearton teaches the use of HI/H<sub>2</sub> having much faster etch rates than CH<sub>4</sub>/H<sub>2</sub> is found unpersuasive because this is not relevant to the claims since they do not have anything to do with the etch rates and Fathimulla further is more concerned about having a smooth etching surface (col. 3, line 65-68). With Pearton's teaching that H<sub>2</sub> is compatible with CH<sub>4</sub> and using H<sub>2</sub> would provide a smooth surface (page 839, 1<sup>st</sup> column, 2<sup>nd</sup> paragraph), one skilled in the art would find it obvious to add H<sub>2</sub> in order to achieve a smooth surface etching.

### **Conclusion**

4. This is a continuation of applicant's earlier Application No. 10/765,647. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duy-Vu N. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Duy-Vu N Deo  
Primary Examiner  
Art Unit 1792

12/10/07

